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MUD cards as a learning aid (MUD = Most Unclear Discussion)

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MUD cards as a learning aid (MUD = Most Unclear Discussion)

Sheila Galt, Microtechnology and Nanoscience (MC2)

Contribution to Chalmers KUL conference to be held Jan. 13, 2011

For a number of years I have been using MUD cards in two Chalmers courses: Laser Engineering (MCC051), and Introduction to Microwave and Photonics Engineering (MCC036). Students write short notes or questions on the "Most Unclear Discussion" (MUD) or "muddiest point" in a lecture and hand them in anonymously. At the beginning of the next lecture, a (hopefully) clarifying discussion takes up the main points from these MUD cards. Experiences from using these MUD cards will be presented, including "how-to" and "why".

After listening to this conference presentation, the listener (often a teacher) should be able to

- Remember and describe to others what is meant by MUD cards
- Decide whether or not MUD cards would be useful in their own teaching
- Predict whether or not students would appreciate this learning aid
- Describe how students' learning can benefit from the use of MUD cards
- Plan how to use MUD cards in daily teaching activities
- Utilize the information collected from MUD cards in planning course development
- Reflect on how one can be certain that the MUD card system really helps the students

The MUD card system has already been adopted by at least one other teacher at Chalmers, Lars Svensson, in the course Data Conversion Techniques (DAT115).

MUD cards are not my own idea, but originate from the following publication:

Mosteller, F. "The 'Muddiest Point in the Lecture' as a Feedback Device," On Teaching and Learning: The Journal of the Harvard-Danforth Center, Vol. 3, 1989, pp. 10–21. Available at http://isites.harvard.edu/fs/docs/icb.topic771890.files/OTL3-Mosteller-Muddiest.pdf

Teachers at MIT have used this technique and evaluated it, documented on the CDIO website:

S. Hall, I. Waitz, D. Brodeur, D. Soderholm, and R. Nasr, "Adoption of active learning in a lecture-based engineering class," in ASEE/IEEE Frontiers in Education Conference, Boston, MA, 2002, pp. T2A–9–15, Available at http://www.cdio.org/knowledge-library/documents/adoption-active-learning-lecture-based-engineering-class

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(MUD = Most Unclear Discussion)

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Learning objectives

- Remember and describe to others what is meant by MUD cards
- Decide whether or not MUD cards would be useful in your own teaching
- Predict whether or not students would appreciate this learning aid
- Describe how students' learning can benefit from the use of MUD cards
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What is meant by MUD cards?

- Most Unclear Discussion
- Muddiest point in the lecture
- Short anonymous note from each student
- 2-3 min at the end of each lecture
- Feedback at start of next lecture

Example MUD card 1

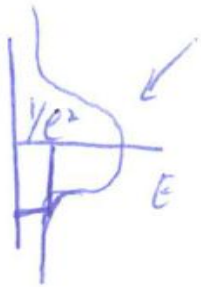
8 Sep 2010 L5 Rays, Waves Fields & Photons

Introduction to Microwave and Photonics Engineering

MUD Card

Most Unclear Discussion or "Muddiest point in the lecture"

Gaussian Beam (concept not clear)



? did not understand

Pictorial concepts

Example MUD card 2

L 7 2009

Laser Engineering MUD Card

"Most Unclear Discussion" or muddiest point in the lecture

What is the physical explaination behind the "damping" term in the linearized reddx. osc. eq.? (Compared to foxes/rabbits, where we don't have damping - whats the difference?)

Physical explanations

Example MUD card 3

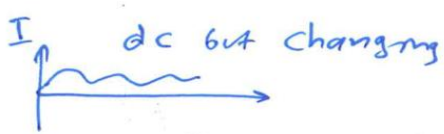
Introduction to Microwave and Photonics Engineering

MUD Card

Most Unclear Discussion or "Muddiest point in the lecture"

Fields

- Static = unchanging = "Dc" (direct current
- oscillating = ~~an~~ AC alternating current



so it can be a static field but changing ?!

obviously ~~but~~ you mean that the direction of the field is unchanged.

Basic concepts

Example MUD card 4

Laser Engineering MUD Card

"Most Unclear Discussion" or muddiest point in the lecture

degeneracy

Terminology

Would MUD cards be useful for you?

- Easy and informal
- Costs a bit of time, not too much
- Better learning
- Much better feedback than silence

Do students appreciate MUD cards?

- Results of course evaluations very positive!

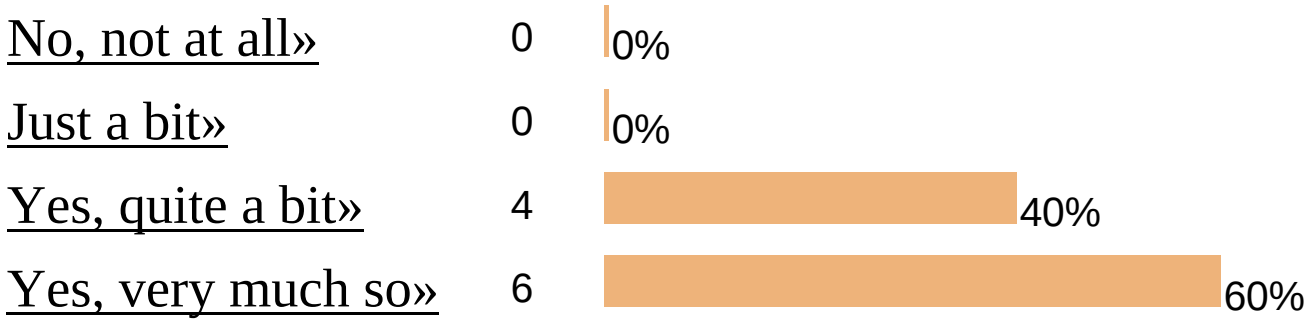
Introduction to microwave and photonics engineering, MCC036, MPMPE, HT2010

What should definitely be preserved to next year?

- *the home work are very good.»*
- *Mud cards.»*
- *The MUD card questions. The home assignments.»*
- *The joy spread by the dedicated teachers!»*
- *Mud cards was good.»*
- *mud card»*

Has the MUD card system been helpful for your learning?

Introduction to microwave and photonics engineering, MCC036, MPMPE, HT2009



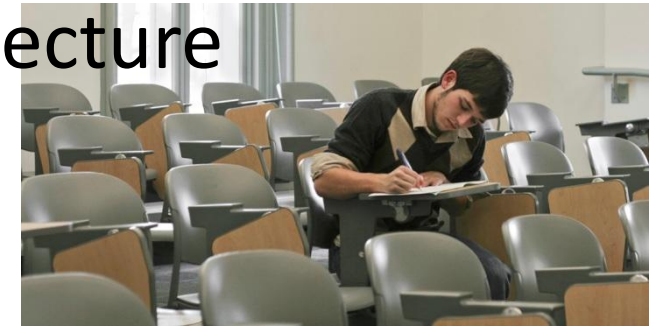
- *I think some of them were not replied...» (Yes, quite a bit)*
- *I would like to have smaller MUD cards, enviromental friendly MUD cards ,)» (Yes, very much so)*
- *BECAUSE IT DEALS ABOUT DIFFERENT PROBLEMS OF UNDERSTANDING FROM DIFFERENT STUDENTS POINT OF VIEW» (Yes, very much so)*
- *especially others mud card questions» (Yes, very much so)*

How can students' learning benefit?

- Encourages active listening
- Encourages reflection on own learning
- Individual students get own needs met
- Students receive help at the right time
- Students are interested in the answers to each others' questions
- Shy students ask questions!

How to use MUD cards in daily teaching activities

- Small (A5) sheet of paper with printed title
- Hand out at beginning of class
- Encourage MUD notes during lecture
- 2-3 min at end for MUD note writing
- Anonymous letter box for collection
- Staple together, label, summarize on back
- Give feedback at start of next lecture



Example of MUD card summary

MUD Card summary

- What is the k vector?
- Why multiple layers in laser mirrors?
- Why oscillation in parallel coupled waveguides?
- how does grating coupling work? match $k_z = \beta$
- M matrix elements
- what is a directional coupler?
- electro-optic effect
  - external field changes n
  - signal E-field much smaller!
- why use side coupling?
- Fabry Perot | Trans. not rays

Use the MUD card info in course development

- Before next course start:
  - redistribute content between lectures
  - include content to address frequent questions before they arise
- Before each lecture:
  - read through last year's MUD cards on present lecture topic

Does the MUD card system really help the students?

- Students feel that the teacher really cares about their learning
- Positive feelings give better learning conditions

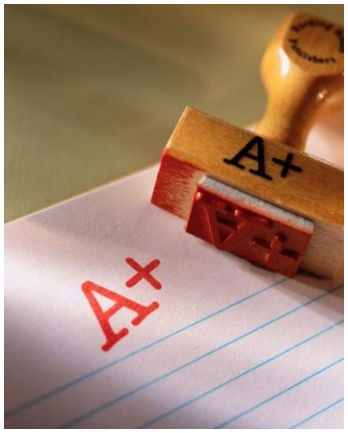
Positive feedback to teacher

understandable

I have a good lecture!

I had the best Sheila lecture Today. Thanks.

Thanks!



Tack så mycket! I enjoy your class.

Summary

- Most Unclear Discussion cards - fast feedback
- Very useful for me as a teacher
- My students love MUD cards
- Fills holes in learning quickly
- A bit of work – but worth it!
- Feedback for now and later
  - course development and recap
- Happy students, reflecting on own learning

Examination

- Are you going to start using (continue using) some form of MUD cards in your teaching?
- Are you going to tell other teachers about the benefits of this method? (which ones?)
- What was the Most Unclear Discussion in this presentation?